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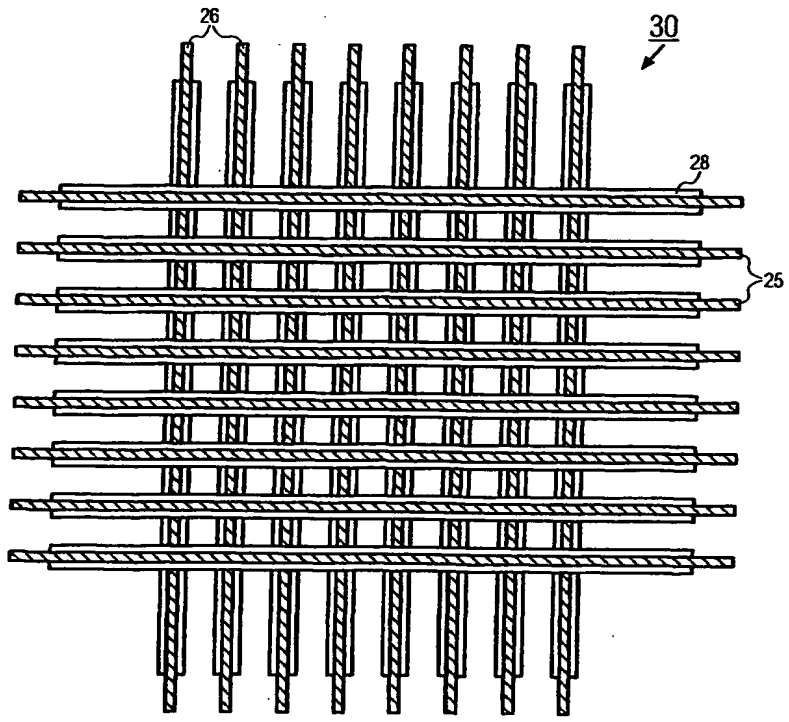
(54) Title: AN APPARATUS AND METHOD FOR GENERATING UNIFORM PLASMAS



(57) Abstract: Disclosed is an apparatus for generating high-density, highly uniform plasmas for plasma processing and synthesis of advanced materials. The apparatus includes a reactor chamber and a chamber top, the chamber top housing two mutually perpendicular sets of equally spaced current carrying conductors (25, 26) coupled in series to a low frequency, radiofrequency generator. Two initially mutually perpendicular unidirectional oscillating current sheets and a time-varying electric field that is azimuthally shifted on 45° with respect to the directions of both current sheets are generated. The plasma produced features high density, low electron temperature, and improved as compared with conventional sources of inductively coupled plasmas with external flat spiral coils, uniformity of plasma density, electron temperature, and plasma potential over large areas and volumes. The proposed method of highly uniform plasma production does not rely on expensive additional magnetic dipolar/multipolar confinement. The apparatus can be up-scaled towards larger dimensions without compromising the production and uniformity of the plasma.

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